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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/825,801

04/01/2004

Gerald W. Iscler

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06/28/2007

DEPARTMENT OF THE AIR FORCE

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EXAMINER

SONG, MATTHEW J

ART UNIT

PAPER NUMBER

1722

MAIL DATE

DELIVERY MODE

06/28/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/825,801

Applicant(s)

ISELER ET AL.

Examiner

Matthew J. Song

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 11-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (US 5,769,944) in view of Kurosawa et al (JP 405097573 A), an English Abstract has been provided.

Park et al discloses a vertical gradient freeze (Bridgman) crystal growth apparatus having a means for applying a magnetic field comprising a vessel 61 for holding a seed crystal 1 (Fig 1 and col 6, ln 1-20). Park et al also discloses a gold thin film 33 is coated on the inner surface of the inner tube 31a of the double 31 (col 4, ln 30-65 and Fig 2), this gold film clearly suggests applicant's outer electrode. Park et al also teaches a furnace comprising a heating coil to heat the

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charge (col 4, ln 25-65), this clearly suggest applicant's heating means. Park et al also teaches providing an electromagnet to the electric furnace to effectively apply a magnetic field, this clearly suggests applicant's means for applying voltage to an induction coil to impose a magnetic field.

Park et al does not teach a small inner elongated electrode mounted within the vessel at or near the vertical axis thereof, which extends into the charge but does not contact the crystal.

In a Bridgman apparatus, Kurosawa et al teaches an electrode is immersed in a melt and an thermoelectromotive force generating between the crucible and the electrode to prevent damage to the crucible during growth and a means for generating an electric current in the melt (Abstract and Fig 1).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Park et al by using an immersed electrode and applying voltage to the electrode as taught by Kurosawa et al to limit damage to the crucible.

In regards to the limitation requiring a means for applying a voltage to the coil to impose a magnetic field lines in the melt such that the flow of the radial electric current crosses the magnetic field line to impart a stirring force to the melt, this limitation is merely an intended use of the apparatus. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. The combination of Park et al and Kurosawa et al teaches all of the structural limitations of the apparatus, thus would be capable of performing the claimed intended use.

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Referring to claim 12, the combination of Park et al and Kurosawa et al teaches an electric voltage between the crucible and the electrode, this clearly suggests the crucible walls serves an electrode.

Referring to claim 13, the combination of Park et al and Kurosawa et al teaches coil, which is capable of the claimed intended use of a heater means and induction coil.

Referring to claim 15, the combination of Park et al and Kurosawa et al teaches a furnace lifting/lowering device ('944 col 4, ln 1-20) and temperature control units ('944 col 5, ln 1-35).

3. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (US 5,769,944) in view of Kurosawa et al (JP 405097573 A), an English Abstract has been provided, as applied to claims 11-13 and 15 above, and further in view of Niikura et al (US 5,700,321).

The combination of Park et al and Kurosawa et al teaches all of the limitations of claim 14, as discussed previously, except an electrode with inner annular spaces, an upper charge and a heater.

In an apparatus for crystal growth, note entire reference, Niikura et al teaches an electrode with inner annular spaces, an upper charge (i.e. melt raw material) and a heater used to replenish a crystal growth melt (Abstract and Fig 3).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the apparatus taught by the combination of Park et al and Kurosawa et al by using the replenishment means taught by Niikura et al to increase the amount of crystal product from the apparatus.

Response to Arguments

4. Applicant's arguments filed 4/5/2007 have been fully considered but they are not persuasive.

Applicant's argument that Park does not teach an outer electrode is noted but is not found persuasive. Applicant alleges that Park is not connected to an electrical conductor and is not an electrode of any kind. Park teaches a stainless steel crucible and a gold film on the inner surface (col 2, ln 55-67). It is the Examiner's position that the crucible can act as an outer electrode in the invention disclosed by Kurosawa. It is the combination that teaches electrically connected electrodes. Kurosawa teaches a metallic crucible and the electrode an a potential difference between the crucible and the electrode (Abstract and Fig 1). Kurosawa clearly depicts the crucible and the electrode an electrically connected in order to limit damage to the crucible.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Park et al is not relied upon to teach the application of voltage to the crucible. Kurosawa teaches voltage is applied to the crucible and the electrode to prevent damage to the crucible (Abstract and Fig 1).

Applicant's argument that by adding the electrode of Kurosawa to Park does not produce a current flow is noted but not found persuasive. The modification of Kurosawa to Park is not simply the addition of the electrode. It would have been obvious to a person of ordinary skill in the art at the time of the invention to use the entire teaching of Kurosawa of an electrode and an electrical voltage between the crucible and the inner electrode to obtain the desired crucible

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damage prevention. For the Kurosawa invention to work, an electrical potential difference must be generated.

In response to applicant's argument that both references are anti-stirring and are believed not combinable to accomplish electromagnetic stirring, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. The prior art teaches a means for generating electric current in the melt by submerging an electrode in the melt and a magnetic coil surrounding the melt, thus would be capable of the claimed intended use. All of the structural features of the instantly claimed apparatus are taught by the prior art. The direction of the current and magnetic field are merely intended use, which does not result in a patentable difference.

Applicant's argument that the combining of the two references does not provide for an electrical connection between the central anode and either the steel tube or gold film is noted but is not found persuasive. Kurosawa clearly teaches an electrical connection between the crucible and the central anode, see Figure 1.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew J Song

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Examiner
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MJS
June 25, 2007

DUANE SMITH
PRIMARY EXAMINER

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6-25-07